

What is claimed is:

1. A hydraulic spool valve having a spool-valve piston, which is arranged in a housing bore in a manner allowing it to be displaced longitudinally and which is assigned, on each end side, a respective compression spring which counteracts a displacement of the spool-valve piston towards this compression spring, while the two compression springs together, owing to their pre-stress, effect a neutral central position of the spool-valve piston, which position encompasses one region and in which the through flow of hydraulic fluid through the spool-valve is blocked, having two inlet bores and an outlet bore arranged between them, for hydraulic fluid, the inlet bores and the outlet bore all leading into the housing bore and a difference in pressure of the hydraulic fluid situated in the two inlet bores causing the spool-valve piston to be displaced, with the consequence that, in the extended end position of the spool-valve piston, the outlet bore is connected to that inlet bore in which the lower pressure of the hydraulic fluid prevails, characterized in that for each compression spring an expansion path, starting from the pre-stressed state and limited by a stop, is provided in such a manner that the spool-valve piston, when displaced on both sides out of its neutral central position into an intermediate position defined by the stop, is acted upon by the two compression springs, but, after the stop has come into effect and the intermediate position has been exceeded in the direction of the extended end position, is only acted upon by the one compression spring, which in each case counteracts the displacement of the said spool-valve piston, and in that even as the spool-valve piston approaches the intermediate

position from the neutral central position a connection between the outlet bore and the inlet bore of lower pressure is produced, the flow cross section of this connection being smaller than when the spool-valve piston has exceeded the intermediate position.

2. The hydraulic spool valve of claim 1 wherein the spool-valve piston has a stem-shaped central part, the outside diameter of which is significantly smaller than the inside diameter of the housing bore, and, at a distance on both sides from the center, a respective control piston with a diameter corresponding to the housing bore, and in that a respective passage collar of reduced diameter directly adjoining the first control pistons to the inside, specifically in such an arrangement that, in the neutral central position of the spool-valve piston, the two first control pistons close the lead-in points of the two inlet bores into the housing bore while, after a first displacement outwards as far as the intermediate position, a passage collar situated in one of the lead-in points opens up the flow path of reduced cross section until, after the spool-valve piston has exceeded the intermediate position, the stem-shaped central part comes to lie on the lead-in point, thus opening up the maximum passage cross-section.

3. The hydraulic spool valve of claim 2 further comprising a separating web, a second control piston, and a pressure pin, which is in operative connection with one of the compression springs, on the spool-valve piston towards the outside on both sides of the first control pistons.

4. The hydraulic spool valve of claim 1 wherein the

compression springs are connected to the end sides of the spool-valve piston via pressure tappets, each pressure tappet having a spring plate and a tappet pin which is reduced in diameter in comparison with the spring plate and
5 faces the spool-valve piston, the spring plate bearing with its one side against the compression spring assigned to it and being designed to bear with its other side against the stop, which determines the possible expansion path of the compression spring.

10

5. The hydraulic spool valve of claim 1 wherein the compression springs are situated in separate spring housings which are connected to the housing of the spool valve and are closed by closure screws with the compression springs
15 bearing against them on their inside.

6. The hydraulic spool valve of claim 1 wherein the compression springs are helical springs which are inserted into spring bores, which run coaxially with the spool-valve
20 piston and have an annular shoulder, which serves as a stop and limitation for the possible expansion path of the helical springs.

7. The hydraulic spool valve of claim 1 wherein the
25 hydraulic spool valve is installed into a hydraulic motor.

8. The hydraulic spool valve of claim 1 wherein the hydraulic spool valve is a flushing spool valve in a hydraulic vehicle drive.

30

9. A hydraulic vehicle drive having a closed hydraulic circuit which comprises a variable displacement pump, a

hydraulic motor driving the drive wheels of the vehicle and two lines which connect the variable displacement pump and the hydraulic motor and are intended for the hydraulic fluid, it being possible for each of the lines to be the
5 high-pressure line or low-pressure line of the closed hydraulic circuit, depending in each case on the direction of travel of the vehicle, having a flushing spool valve which is situated parallel to the hydraulic motor on the lines of the hydraulic circuit and, with the difference in
10 pressure of the hydraulic fluid that prevails in the normal driving mode, connects the particular low-pressure line to a flushing-pressure limiting valve, which conducts a flushing flow of the hydraulic fluid through the hydraulic motor, but interrupts the connection to the flushing-pressure limiting
15 valve if the difference in pressure fails to appear, characterized by such a design of the flushing spool valve that, with a difference in pressure between the high-pressure and low-pressure line that is significantly smaller in comparison to the normal driving mode, although the
20 connection between the low-pressure line and the flushing-pressure limiting valve is likewise produced, the volume of the flushing flow is, however, significantly reduced in comparison to the normal driving mode.

25 10. The hydraulic vehicle drive of claim 9 wherein the flushing spool valve has the features of the hydraulic spool valve of claim 1.

11. The hydraulic vehicle drive of claim 9 further
30 comprising a filling pump for the supply of a feed pressure circuit for the closed hydraulic circuit wherein a flushing-pressure limiting valve is additionally connected to the

feed pressure circuit via a connecting line.